

From where	The conducting portion	The respiratory portion
<b>Include</b>	<ul style="list-style-type: none"> <li>♥ Nasal cavity</li> <li>♥ pharynx</li> <li>♥ Larynx</li> <li>♥ Trachea</li> <li>♥ Primary bronchi (RT +LT)</li> <li>♥ 2ry , 3ry bronchi</li> <li>♥ Bronchioles</li> <li>♥ Terminal bronchioles</li> </ul>	<ul style="list-style-type: none"> <li>♥ Respiratory bronchioles</li> <li>♥ Alveolar ducts</li> <li>♥ Alveolar sacs</li> <li>♥ Alveoli</li> </ul>
<b>Function</b>	1- Conduction of air 2- Conditioning of air	O <sub>2</sub> /CO <sub>2</sub> exchange take place between blood & inspired air
<b>Structure\ function</b>	1- Conduction of air: <ul style="list-style-type: none"> <li>• Cartilages to prevent collapse,</li> <li>• Elastic &amp; smooth ms. fibers for flexibility</li> </ul> 2- Conditioning of air: <ul style="list-style-type: none"> <li>• Nasal hairs: clean &amp; trap large particles</li> <li>• Capillaries: adjust temperature</li> <li>• Respiratory mucosa: adjust moisture &amp; filters air</li> </ul>	

# Nasal cavity

<b>From where</b>	<b>Nasal cavity</b>
<b>Consists of</b>	θ Vestibule θ Respiratory area θ Olfactory area
<b>Char</b>	<ul style="list-style-type: none"> <li>♥ 2 cavities separated by nasal septum</li> <li>♥ Their lateral walls contain 3 bony projections (conchae)               <ul style="list-style-type: none"> <li>1- Superior                      2- middle                      3- inferior</li> </ul> </li> <li>♥ The conchae increase the surface area for better conditioning of the inspired air</li> <li>♥ Superior one covered with Olfactory epithelium</li> <li>♥ Middle &amp; inferior covered with Respiratory epithelium= a ciliated pseudostratified columnar epithelium</li> </ul>

From where	Vestibule	Olfactory area
Def \ site	Is the anterior part	Covers the roof of nasal cavities & superior conchae.
Formed of	1- skin 2- sebaceous gland 3- hair	-----
Lined with	keratinizes stratified squamous epithelium	-----
Char	-----	<ul style="list-style-type: none"> <li>♥ Contains chemoreceptors of smell</li> <li>♥ 3 cell types are present:               <ul style="list-style-type: none"> <li>1- Olfactory receptor neurons</li> <li>2- Supporting (sustentacular) cells</li> <li>3- Basal cells (stem cell)</li> </ul> </li> <li>♥ The olfactory mucosa consists of:               <ul style="list-style-type: none"> <li>1. The epithelium rests on</li> <li>2. lamina propria(CT) which contains:                   <ul style="list-style-type: none"> <li>- Bowman's glands, secrete serous fluid → surface</li> <li>- BV &amp; olfactory nerve fibers</li> </ul> </li> </ul> </li> </ul>

# Structure of conducting portion

From where	Paranasal sinuses	Larynx	Trachea	Bronchial tree	Bronchioles	Terminal bronchioles
<b>Type</b>	1- Frontal 2- ethmoidal 3- sphenoidal maxillary	-----		1- Primary (Extra pulmonary) bronchi: [ RT & LF → similar to trachea (but cartilage is complete ring) ]  2- Secondary (Intra-pulmonary) bronchi: [ within the lung → divide into 3ry bronchi Its wall is formed of 4 layers (NO submucosa): • Mucosa • Musculosa • Cartilage plates • Adventitia  <b>Structure of 2ry&amp;3ry bronchi</b> <b>Char</b> عند شرح  3- Bronchioles  4- Terminal bronchioles		
<b>Site</b>	الرجوع للسلايدات لتحديد الموقع	At the beginning of trachea	Tube extends from larynx & ends by dividing into 2 bronchi			
<b>Lined with</b>	thin respiratory epithelium with few goblet cells which is very adherent to the periosteum	respiratory epithelium				
<b>Fun</b>	-----	- production of voice (vocal cords)  - Prevent food from entering the trachea (epiglottis has elastic cartilage in its lamina propria)				
<b>Char</b>	♥ Skull cavities open in nasal cavity ♥ Inflammation = sinusitis ----- severe pain	♥ Its beginning is guarded by epiglottis	♥ Kept open by about 20 C-shaped Cartilage rings (hyaline cartilage)  ♥ Its wall is formed of 4 layers: 1. Mucosa [ respiratory epithelium + lamina propria] 2. Submucosa [ loose CT. contain tracheal glands (mucus gland) ] 3. Hyaline cartilage\ cartilage layer [ C- shaped cartilage rings, the gap between cartilage ends connected by elastic ligament & Trachialis ms (smooth ms)] 4. adventitia [ loose CT]	*** Structure of 2ry & 3ry bronchi: • Mucosa: respiratory epith + goblet cells lamina propria has MALT (mucosa associated lymphatic tissue)  • Musculosa: spiral layers of smooth ms. encircling the mucosa  • Cartilage plates  • adventitia	• Small airways ↓ 0.5 mm  • Its wall has No (submucosa, cartilage, lymphatic nodules)  • Its wall formed of 3 layers  ♥ Mucosa: • Simple columnar ciliated + Clara cells  ♥ Musculosa: complete layer of circularly arranged s.ms.  ♥ Adventitia: CT layer	• The smallest & last part of conducting portion  • Lining epithelium: simple cubical p. ciliated + Clara cells

## Clara cells

θ Secretory cells with Dome shaped apex

θ They also present in terminal bronchioles

θ Protein Secreting cell prevent alveolar collapse

# Structure of respiratory portion

<b>From where</b>	<b>Alveoli</b>
<b>Def</b>	Sac like structures
<b>Fun</b>	Responsible for gas exchange
<b>Char</b>	<p>They separated by thin septa called <b>inter-alveolar septa</b></p> <ul style="list-style-type: none"> <li>- Def of inter-alveolar septa: The wall between two adjacent alveoli</li> <li>- Content of inter-alveolar septa:             <ol style="list-style-type: none"> <li>1- Pores</li> <li>2- Capillary network</li> <li>3- Elastic &amp; reticular fibers</li> <li>4- Cells ( alveolar macrophages- fibroblast = interstitial cells</li> </ol> </li> </ul>
<b>Lined with</b>	<p>2 type of cells:</p> <ul style="list-style-type: none"> <li>♥ Type I pneumocyte</li> <li>♥ Type II pneumocyte</li> </ul>

<b>From where</b>	<b>Type I pneumocyte</b>	<b>Type II pneumocyte</b>
<b>Most cells</b>	97%	3%
<b>Shape of cells</b>	<ul style="list-style-type: none"> <li>- Flat simple squamous cells</li> <li>- flat nuclei</li> </ul>	<ul style="list-style-type: none"> <li>- Cuboidal cells</li> <li>- central nuclei</li> <li>- foamy cytoplasm</li> </ul>
<b>Fun</b>	Gas exchange	Secrete surfactant + stem cells

# Epithelial transitions

<b>Site of respiratory system</b>	<b>Types of epithelium tissue</b>
<ol style="list-style-type: none"> <li>1- Trachea</li> <li>2- Bronchi</li> </ol>	pseudostratified ciliated columnar epithelium
<ol style="list-style-type: none"> <li>1- Bronchioles</li> </ol>	simple columnar ciliated epithelium
<ol style="list-style-type: none"> <li>1- alveolar ducts</li> <li>2- alveoli</li> </ol>	simple squamous epithelium

